

WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY LETTERS PATENT

OF THE UNITED STATES IS:

1. An image forming apparatus comprising:
an image bearing member configured to bear an
5 electrostatic latent image thereon;
a developing sleeve comprising:
a nonmagnetic sleeve having grooves with a depth
of from 0.1 to 0.2 mm on an outer surface thereof in a
longitudinal direction thereof at an interval of from 0.4 to
10 0.6 mm; and
a magnet roller fixedly set in the nonmagnetic
sleeve,
wherein the developing sleeve magnetically bears thereon
a magnetic two component developer comprising a toner and a
15 carrier while rotating to form a magnet brush thereon,
wherein the developing sleeve rubs the image bearing
member with the magnet brush to visualize the electrostatic
latent image at a rubbing region,
wherein the magnet roller comprises a main magnet pole,
20 which faces the latent image bearing member and which comprises
a main magnet and auxiliary magnets adjacent to the main magnet,
wherein the main magnet has a magnetic flux density in
a normal line direction of from 100 to 200 mT at the rubbing
region, an attenuation ratio of the magnetic flux not less than
25 40 % and a half width not greater than 25°, and each of the
auxiliary magnets has an attenuation ratio of a magnetic flux
density in a normal line direction not less than 40 %, and is

arranged at an angle not greater than 35° from the main magnet,
and wherein the toner has a volume average particle
diameter of from 4.0 to 7.0 μm , and includes fine particles
having a circle equivalent diameter not greater than 2 μm in
5 an amount not greater than 20 % by number.

2. The image forming apparatus according to Claim 1,
wherein the toner comprises at least a wax and a binder resin,
and wherein when a cross section of particles of the toner was
10 observed with a transmission electron microscope, a surface
portion of the particles of the toner, which surface portion
has a depth of from 0 to 1 μm , has a wax area of from 5 to 30 %.

3. The image forming apparatus according to Claim 2,
15 wherein the wax exists in an outer portion of the particles of
the toner, which outer portion has a depth of from 0 to half
a radius of the particles, in an amount not less than 65 % by
number of the wax dispersed in the entire toner.

20 4. The image forming apparatus according to Claim 3,
wherein the wax dispersed in the toner does not appear on a
surface of the toner.

5. The image forming apparatus according to Claim 2,
25 wherein particles of the wax having a dispersion diameter of
from 0.5 to 3 μm are present in the particles of the toner in
an amount not less than 70 % by number based on total wax

particles in the particles of the toner.

6. The image forming apparatus according to Claim 2,
wherein the wax is selected from carnauba waxes subjected to
5 a treatment of removing a free aliphatic fatty acid, rice waxes,
montan waxes and combinations thereof.

7. A method for developing an electrostatic latent image,
comprising:

10 forming a magnet brush of a magnetic developer comprising
a toner and a carrier on a developing sleeve comprising a
nonmagnetic sleeve and a magnet roller located in the
nonmagnetic sleeve; and

15 rubbing a surface of an image bearing member bearing the
electrostatic latent image thereon with the magnet brush to form
a toner image on the image bearing member,

wherein the magnet roller comprises a main magnet pole,
which faces the latent image bearing member and which comprises
a main magnet and auxiliary magnets adjacent to the main magnet,

20 wherein the main magnet has a magnetic flux density in
a normal line direction of from 100 to 200 mT at the rubbing
region, an attenuation ratio of the magnetic flux not less than
40 % and a half width not greater than 25°, and each of the
auxiliary magnets has an attenuation ratio of a magnetic flux
25 density in a normal line direction not less than 40 %, and is
arranged at an angle not greater than 35° from the main magnet,
wherein the nonmagnetic sleeve has grooves with a depth of from

0.1 to 0.2 mm on an outer surface thereof in a longitudinal direction thereof at an interval of from 0.4 to 0.6 mm,

and wherein the toner has a volume average particle diameter of from 4.0 to 7.0 μm , and includes fine particles having a circle equivalent diameter not greater than 2 μm in an amount not greater than 20 % by number.

8. The image forming method according to Claim 7, wherein the toner comprises at least a wax and a binder resin, and wherein when a cross section of particles of the toner was observed with a transmission electron microscope, a surface portion of the particles of the toner having a depth of from 0 to 1 μm has a wax area of from 5 to 30 %.

9. The image forming method according to Claim 8, wherein the wax exists in an outer portion of the particles of the toner, which outer portion has a depth of from 0 to half a radius of the particles, in an amount not less than 65 % by number of the wax dispersed in the entire toner.

10. The image forming method according to Claim 9, wherein the wax dispersed in the toner does not appear on a surface of the toner.

11. The image forming method according to Claim 8, wherein particles of the wax having a dispersion diameter of from 0.5 to 3 μm are present in the particles of the toner in an amount

not less than 70 % by number based on total wax particles in the toner.

12. The image forming method according to Claim 8, wherein
5 the wax is selected from carnauba waxes subjected to a treatment of removing a free aliphatic fatty acid, rice waxes, montan waxes and combinations thereof.

13. A process cartridge for an image forming apparatus,
10 comprising:

an image bearing member configured to bear an electrostatic latent image thereon; and
a developing device configured to develop the electrostatic latent image with a developer comprising a toner
15 to form a toner image on the image bearing member,
wherein the developing device comprises:

a developing sleeve comprising:
a nonmagnetic sleeve having grooves with a depth of from 0.1 to 0.2 mm on an outer surface thereof
20 in a longitudinal direction thereof at an interval of from 0.4 to 0.6 mm; and
a magnet roller fixedly set in the nonmagnetic sleeve,

wherein the developing sleeve magnetically bears thereon
25 a magnetic two component developer comprising a toner and a carrier while rotating to form a magnet brush thereon,
wherein the developing sleeve rubs the image bearing

member with the magnet brush to visualize the electrostatic latent image at a rubbing region,

wherein the magnet roller comprises a main magnet pole, which faces the latent image bearing member and which comprises 5 a main magnet and auxiliary magnets adjacent to the main magnet,

wherein the main magnet has a magnetic flux density in a normal line direction of from 100 to 200 mT at the rubbing region, an attenuation ratio of the magnetic flux not less than 40 % and a half width not greater than 25°, and each of the 10 auxiliary magnets has an attenuation ratio of a magnetic flux density in a normal line direction not less than 40 %, and is arranged at an angle not greater than 35° from the main magnet, and wherein the toner has a volume average particle diameter of from 4.0 to 7.0 μm , and includes fine particles 15 having a circle equivalent diameter not greater than 2 μm in an amount not greater than 20 % by number.

14. The process cartridge according to Claim 13, wherein the toner comprises at least a wax and a binder resin, and wherein 20 when a cross section of particles of the toner was observed with a transmission electron microscope, a surface portion of the particles of the toner, which surface portion has a depth of from 0 to 1 μm , has a wax area of from 5 to 30 %.

25 15. The process cartridge according to Claim 14, wherein the wax exists in an outer portion of the particles of the toner, which outer portion has a depth of from 0 to half a radius of

the particles, in an amount not less than 65 % by number of the wax dispersed in the entire toner.

16. The process cartridge according to Claim 15, wherein
5 the wax dispersed in the toner does not appear on a surface of
the toner.

17. The process cartridge according to Claim 14, wherein
particles of the wax having a dispersion diameter of from 0.5
10 to 3 μm are present in the particles of the toner in an amount
not less than 70 % by number based on total wax particles in
the particles of the toner.

18. The process cartridge according to Claim 14, wherein
15 the wax is selected from carnauba waxes subjected to a treatment
of removing a free aliphatic fatty acid, rice waxes, montan
waxes and combinations thereof.